GENERATING SCANNING SPOT LOCATIONS FOR LASER EYE SURGERY

ABSTRACT OF THE DISCLOSURE

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Scanning spot locations are generated for ablating tissue using a scanning laser beam over a treatment region by fitting a target function representing a desired lens profile of ablation with a basis function representing a treatment profile produced by overlapping scanning spots in a particular treatment pattern. Symmetry effects are utilized to simply the process for determining the scanning spot locations. In some embodiments, the basis function is a two-dimensional function representing a two-dimensional section of a three-dimensional treatment profile which has symmetry with respect to the two-dimensional section extending along the treatment pattern. For example, the treatment pattern is generally straight for myopic and hyperopic cylinders, and is generally circular for myopia and hyperopia. The target function and the basis function may be discrete for implementation in a software algorithm, and be fitted using a least square fit. The fit produces ablation depths for discrete scanning spots which are used to calculate the number of pulses at each reference position along the two-dimensional section. The pulses are distributed along the treatment pattern to produce the desired overlapping effect.

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